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PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improvements in or relating to apparatus for Manufacturing Phonograph Record Discs

We, PHILIPS RECORDS LIMITED, of Abacus House, 33, Gutter Lane, London, E.C.2., a British Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to the manufacture of phonograph record discs.

In a known process of manufacturing phonograph recordings a master recording which may, for example, be a recording on magnetic tape is first transferred into a grooved recording on a lacquered disc. The recorded surface of the lacquered disc is then made electrically conductive by chemical deposition of a very thin film of sliver which accurately follows the contours of the recorded grooves. The silver surface of the recording is then built up to about 0.25 mm. thickness by electroforming a nickel plating over the recorded surface. The nickel plating is then separated or "stripped" from the original master and this forms a negative recording which, after suitable treatment, is subjected to a further nickel plating process which is again stripped from the negative recording surface and results in a master positive which is virtually a metal recording of the original lacquer disc. From this master positive several negative stampers may be obtained by forming a further plated surface which is again stripped from the metal master.

From this brief description of the process it will be appreciated that the plating processes involved in the manufacture of phonograph record discs form a vital and critical factor in the quality of the final stampers and this invention is more particularly concerned with improved means for electroplating the recorded surface.

The initial electroplating operation which results in the nickel negative recording and which is stripped from the lacquered metal disc is very fragile and is required to be rota-

tionally suspended in a plating bath so that the further plating process is confined to its recorded side only and that the plating is protected from covering the peripheral edge to facilitate subsequent separation of the plated surfaces.

Prior to this invention it had been known to provide a rubber mask which covered the rear face of the disc to be plated and included a rubber beading which could be snapped over the peripheral edge of the disc to prevent uneven plating of the edges of the disc, an effect known in the art as "treeing."

This known method of using a rubber mask and beading has many disadvantages, for example, to provide a good seal for the mask a degree of tension is required and this tends to buckle or bow the thin surface of the disc being plated making subsequent stripping of the thin surfaces difficult to perform without damage to the delicate recording surface. In order to overcome this difficulty it is known to provide a radial corrugation or peripheral step on the outer edge of the disc to be plated to increase its rigidity, but this proposal requires a pre-calculated increase in the overall diameter of the disc to allow for the subsequent removal of the reinforced edge, and furthermore, stripping of the surfaces is made more difficult by the inclusion of the reinforced edge.

According to this invention there is provided a plating holder for a phonograph disc comprising a circular framework having an inwardly disposed peripheral step which includes a resilient sealing ring of rectangular cross section for supporting the outer edge of a disc to be plated, an apertured backplate arranged to be urged against the rear of the disc when in position inside the framework, and an electrically conductive shaft arranged to enter said aperture and provide electrical contact to the disc.

According to another embodiment of this invention the circular framework and backplate

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is constructed from an inert plastic material, for example, polymethyl methacrylate, and the rectangular cross sectioned sealing ring is made of a resilient plastic material such as polychloroprene rubber. In yet another embodiment of this invention one or more additional sealing rings are provided for substituted location in the strip, each ring having a predetermined reduced inner diameter to provide a reduction in plated diameter to be made in each successive plating operation. This modification means that plating operations are made to size and obviates the necessity of cutting stampers down to correct diameter.

Further modifications can be made to this invention, for example, a chamfer can be included along the inner edge of the inwardly disposed step in a direction towards the sealing ring so that the plating process has good access right up to the unmasked edge of the disc being plated, which edge is defined by the sealing ring. Furthermore, a plurality of wedge shaped turnbuckles can be included along the edge of the circular framework which can be turned to bear against the backplate to urge and clamp it into position against the rear face of the disc to be plated.

A plating holder for a phonograph disc constructed in accordance with this invention displays several advantages over known holders. For example:—

The recorded surface for plating is firmly held without stress and an accurate mask against unwanted plating is provided. Each plating process is "grown" to finished size, thus obviating the necessity of cutting the final stampers to size. The firm clamping of the peripheral edge of the disc being plated prevents possible bowing or distortion of its surface which would otherwise tend to cause premature separation of the surfaces during the plating process.

The good build-up of plating up to the edge of the plating surface facilitates the eventual "stripping" of the plated surfaces and obviates the use of special separating machinery.

Overplating of the edges, "treeing" is prevented and the known use of introducing reinforcement of edges is made unnecessary.

To assist in understanding this invention a description of it will now be given with reference to the accompanying drawing, in which:

Figure 1 shows the holder and backplate complete with disc to be plated and

Figures 2 and 3 are part sections taken along the line A—A of Figure 1.

In Figure 1 a circular framework 1 has an inwardly disposed step 2 the upper edge of which includes a rectangular cross sectional resilient sealing ring 3. Three wedge shaped turnbuckles 4 are provided at equal distances along the periphery of the framework 1. Reference 5 shows a phonograph disc to be plated, which when in position in the framework 1

will have its peripheral edge seated on the sealing ring surface 3. The disc 5 has a boss 6 secured to its centre for screw engagement with a shaft 10 for rotatable suspension in a plating bath. The shaft 10, which is electrically conductive, will also act as the cathode connection for the plating process. A backplate 7 dimensioned to closely fit the inner edge of the framework 1 is provided with an aperture 8 to allow protrusion of the boss 6. The thickness of the backplate is made sufficient to form a rigid backing for the disc 5 and also provides a co-acting surface for the wedge shaped turnbuckles 4.

In Figures 2 and 3 the same part references have been used as in Figure 1. Figure 2 shows the phonograph disc 5 in position within the framework 1 and the backplate 7 protecting the rear surface of the disc 5 prior to tensioning against the resilient ring 3. The inner edge of the step is shown to include a chamfer 9 in a direction towards the sealing ring 3. This chamfer increases the accessibility of the plating process right up to the required edge of the phonograph disc 5 and results in a strong build-up which will facilitate the eventual stripping of the plated surface.

Figure 3 shows the same parts clamped into position. The clamping action is effected by turning the wedge shaped turnbuckle 4 to bear against the upper side of the circular backplate 7 which causes the outer periphery of the disc 5 to be urged against and sealed by the resilient ring 3.

In the drawings shown in Figures 2 and 3 this sealing ring 3 is shown having maximum sealing area as would be used in a plating operation for a final stamper. In previous plating operations required to arrive at this stage, other sealing rings having an increased internal diameter (reduced sealing area) had been used to provide an accurate reduction in plating diameter at each plating process until the final desired diameter was obtained for the stamper.

WHAT WE CLAIM IS:—

1. A plating holder for a phonograph disc comprising a circular framework having an inwardly disposed peripheral step which includes a resilient sealing ring of rectangular cross section for supporting the outer edge of a disc to be plated, an apertured backplate arranged to be urged against the rear of the disc when in position inside the framework, and an electrically conductive shaft arranged to enter said aperture and provide electrical contact to the disc.

2. A plating holder for a phonograph disc as claimed in Claim 1, wherein the circular framework and circular backplate is of an inert plastic material.

3. A plating holder for a phonograph disc as claimed in Claim 1 or 2, wherein the resilient sealing ring is of polychloroprene rubber.

4. A plating holder for a phonograph disc as claimed in any of Claims 1, 2 or 3, compris-

ing in addition one or more further sealing rings for substituted location variation in said step, each sealing ring having a predetermined reduced inner diameter to provide a reduction in plating diameter so that each plating operation is to finished size.

5 5. A plating holder for a phonograph disc as claimed in Claim 1, 2, 3 or 4, wherein the inner edge of the peripheral step is cham-
10 fered towards the sealing ring to allow an easy access of the plating process to a given edge of the disc.

6. A plating holder for a phonograph disc as claimed in any of the preceding claims,

wherein the circular framework includes a plu- 15
rality of wedge shaped turnbuckles positioned about its circumference to urge and clamp the backplate against the disc to be plated.

7. A plating holder for a phonograph disc as herein described with reference to the ac- 20
companying drawings.

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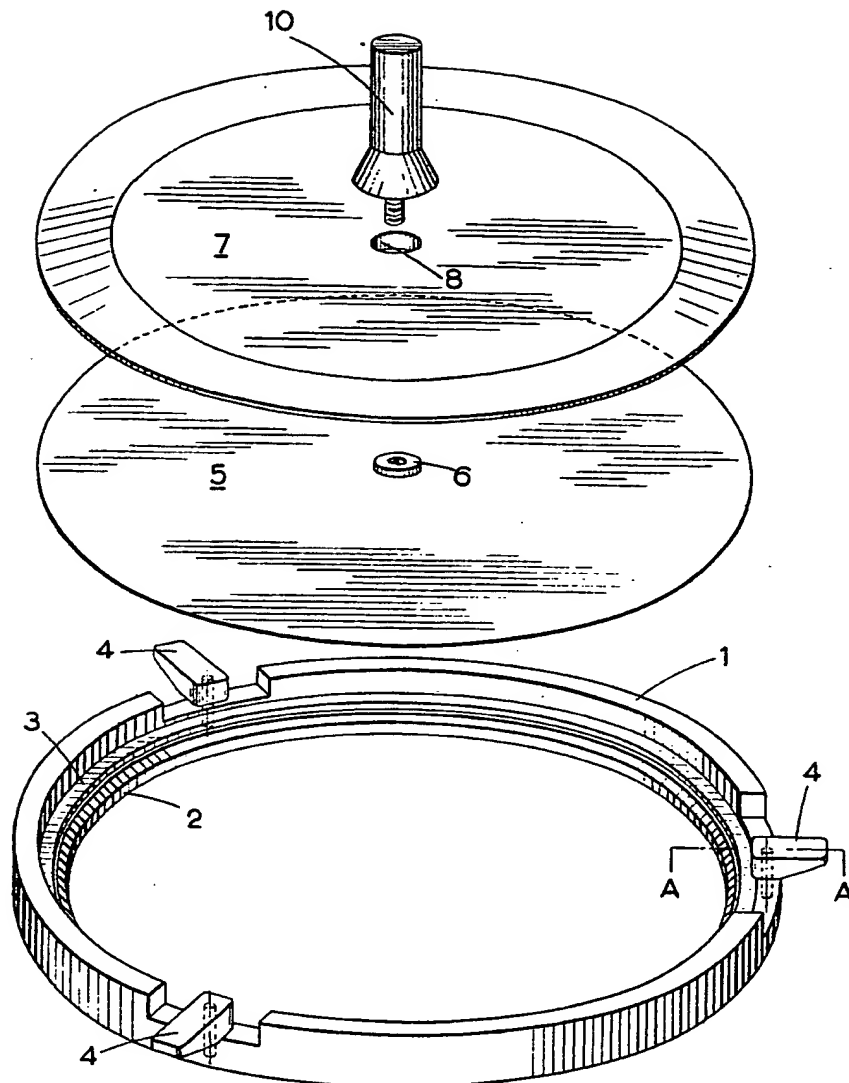


FIG. 1.

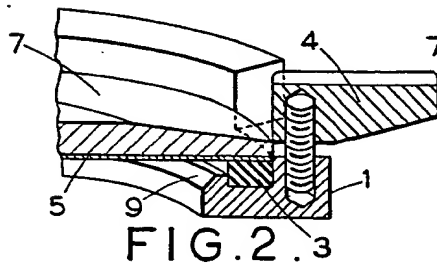


FIG. 2. 3

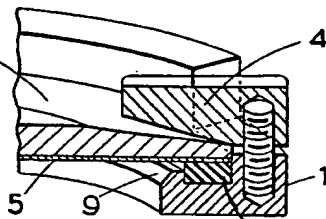


FIG. 3. 3